DISSERTATION TITLE:

EFFECT OF S-GLASS FIBRES ON THE FLEXURAL STRENGTH OF ACRYLIC RESINS USED FOR TEMPORARY RESTORATIONS- AN IN VITRO STUDY

AIM:

The aim of this in vitro study is to evaluate the effect of S- glass fibre reinforcement on the flexural strength of autopolymerizing PMMA and to analyse the effect of silanization on it.

MATERIALS AND METHODS:

A stainless steel mould of 25mm (±2.0)×2mm (±0.1)×2mm (±0.1) (according to ISO4049/2000) was used for the fabrication of all specimens and an acrylic jig was fabricated using autopolymerizing poly methyl methacrylate for orienting the split moulds. Autopolymerizing poly methyl methacrylate (Shade: C) was the provisional restorative material that was used in the study. The specimens were fabricated under 5 groups; Group A- control group (Unreinforced autopolymerizing PMMA), Group B- Autopolymerizing PMMA reinforced with short S glass fibres treated with monomer, Group C- Autopolymerizing PMMA reinforced with long S glass fibres treated with monomer, Group D- Autopolymerizing PMMA reinforced with short S glass fibres treated with silane, Group E- Autopolymerizing PMMA reinforced with long S glass fibres treated with silane. For all the reinforced groups, 4wt% of glass fibre (4.75mg) was added. For Groups B and D, short S glass fibres of 2mm length and for Groups C and E, long S glass fibres of 23mm length were used, with the consideration of mould dimension. All the fabricated specimens were stored in distilled water for 24 hrs and maintained at 37 degree Celsius in incubator. The specimens were then subjected for

testing using three point bending test in a universal testing machine, to determine the flexural strength of the specimens.

RESULTS:

The mean and standard deviations of flexural strength of different groups were evaluated and one way ANOVA test was performed to find the statistical significance. On analyzing the results of the ANOVA test, it was seen that the flexural strength differed significantly between the groups (F=29.382, P=0.000), with the highest value shown by Group E (Autopolymerizing PMMA reinforced with long S glass fibres treated with silane) and with the least value shown by Group A (Unreinforced PMMA). Multiple intergroup comparison using Tukey post hoc test revealed that there was no significant difference between groups surface treated with monomer and silane, irrespective of length of the fibre used for reinforcement.

CONCLUSION:

Within the limitations of the study, reinforcement of autopolymerizing PMMA with S glass fibre had increased the flexural strength significantly. Placement of unidirectional fibre along the tension side had shown improved results when compared to randomly oriented fibres. There was no significant difference between groups surface treated with monomer and silane, irrespective of length of the fibre used for reinforcement. Thus, S- Glass fibre reinforced autopolymerizing PMMA could be considered as a material of choice for long span anterior and short span posterior provisional restorations which needed long term intraoral usage, with the support of results from this study and future clinical studies.

KEYWORDS: Autopolymerizing PMMA, Glass fibres, Silane, Flexural strength, provisional restorative resins.